# (SD2023-060) Penalized Reference Matching algorithm with Stimulated Raman Scattering (PRM-SRS) microscopy: Multi-Molecular Detection of Hyperspectral images

Tech ID: 32951 / UC Case 2021-Z08-1

## BACKGROUND

Lipids play crucial roles in many biological processes under physiological and pathological conditions. Mapping spatial distribution and examining metabolic dynamics of different lipids in cells and tissues in situ are critical for understanding aging and diseases. Commonly used imaging methods, including mass spectrometry-based technologies or labeled imaging techniques, tend to disrupt the native environment of cells/tissues and have limited spatial or spectral resolution, while traditional optical imaging techniques still lack the capacity to distinguish chemical differences between lipid subtypes.

## TECHNOLOGY DESCRIPTION

To overcome these limitations, researchers at UC San Diego have developed a new hyperspectral imaging platform that integrates a Penalized Reference Matching algorithm with Stimulated Raman Scattering (PRM-SRS) microscopy. With this new approach, they directly visualized and identified multiple lipid species in cells and tissues in situ with high chemical specificity and subcellular resolution. PRM-SRS imaging also revealed subcellular distributions of sphingosine and cardiolipin in the human brain sample.

Software code and patent rights are available for commercial development through licensing.

## APPLICATIONS

This method has broad applications in multiplexed cell and tissue imaging.

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## OTHER INFORMATION

**KEYWORDS**

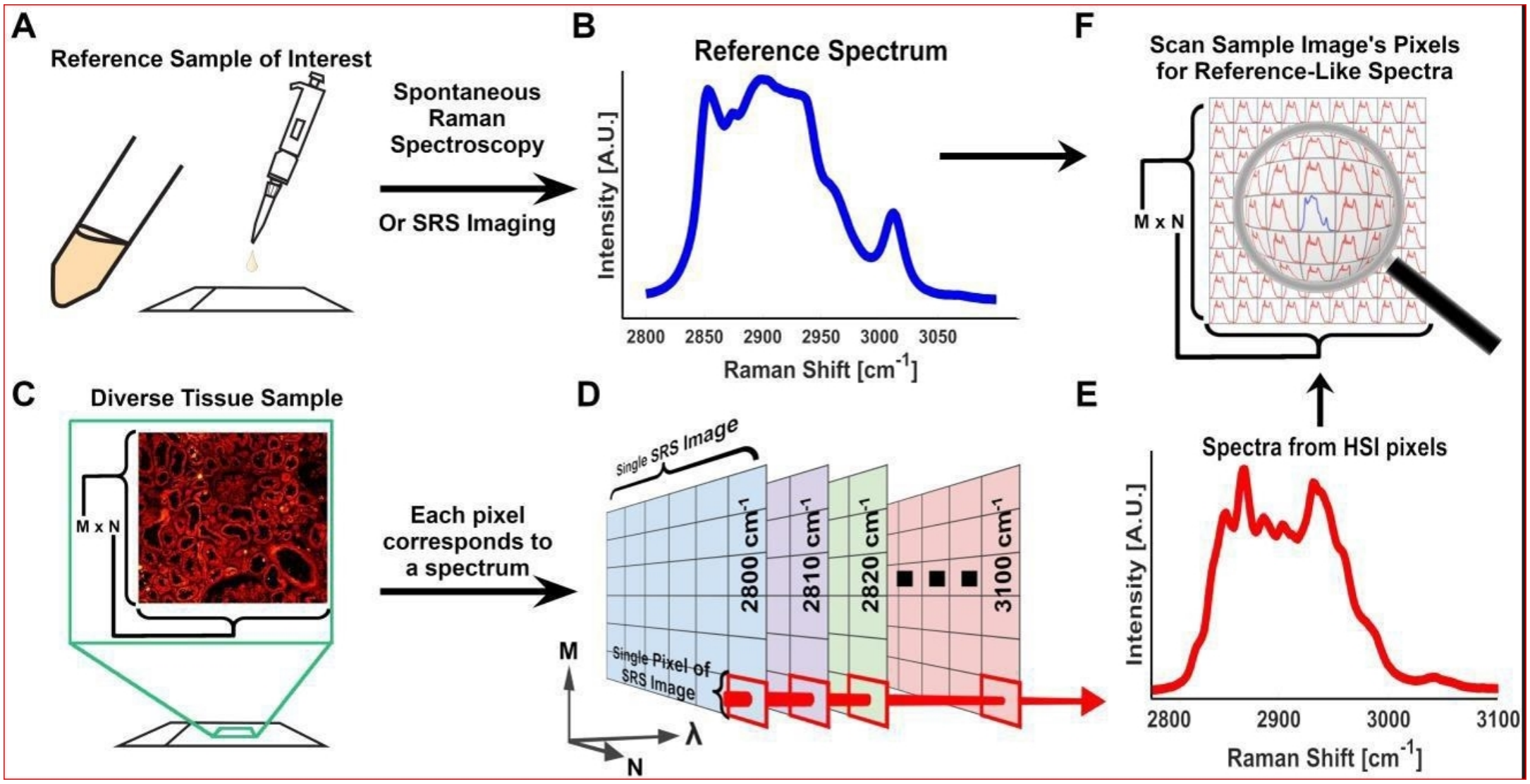
rapid detection of molecules, penalty reference matching, Multi-molecular, SRS microscopy

**CATEGORIZED AS**

- Imaging
  - Molecular
  - Software

**RELATED CASES**

2021-Z08-1




**ADVANTAGES**

Compared with other techniques, PRM-SRS demonstrates unique advantages, including faster data processing and direct user-defined visualization with enhanced chemical specificity for distinguishing clinically relevant lipid subtypes in different organs and species.

**STATE OF DEVELOPMENT**

**INTELLECTUAL PROPERTY INFO**

**RELATED MATERIALS**


- Multi-Molecular Hyperspectral PRM-SRS Imaging Wenxu Zhang, Yajuan Li, Anthony A. Fung, Zhi Li, Hongje Jang, Honghao Zha, Xiaoping Chen, Fangyuan Gao, Jane Y. Wu, Huaxin Sheng, Junjie Yao, Dorota Skowronska-Krawczyk, Sanjay Jain, Lingyan Shi bioRxiv 2022.07.25.501472; doi: https://doi.org/10.1101/2022.07.25.501472 - 07/25/2022



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